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Sensory Preferences of Consumers for High pH, Low pH Commodity Pork Loins and Berkshire Pork Loins

A.S. Leaflet R2056

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Summary and Implications

Consumers desire pork that will transcend into a pleasurable dining experience. Tenderness, juiciness, and flavor are sensory parameters that will primarily determine consumer acceptance of pork in the retail market. The pH of the muscle tissue appears to be one of the major factors influencing the sensory perception of pork. In this study consumers were asked to evaluate loin samples of high pH (6.10), low pH commodity loins (5.65) and berkshire loins (5.58). There was no significant difference in overall acceptance between the high pH and berkshire loins but a difference was noted for the low pH loins. High pH and berkshire pork loins were preferred over the low pH for tenderness and the high pH tended to have a slight preference over the Berkshire. For juiciness the high pH and berkshire loins were significantly superior over the low pH loins. Consumers in this study choose the berkshire loins over the high and low pH loins for flavor. But there was less difference noted in flavor between the berkshire and high pH loins. The Berkshire breed is known for its superior muscle quality and consumer preference. Even though the berkshire loins were the lowest in pH in this study, the "Berkshire influence" was evident for consumer satisfaction and preference. Therefore, according to the consumers participating in this sensory panel, high pH and berkshire loins would provide the most acceptable dining experience for a pork consumer. However, when the panelist were given the opportunity to evaluate the uncooked samples for their preference as a purchase selection at the meat counter, approximately 75% chose the low pH loin sample which was the lightest in color and had the least amount of marbling. Therefore, this clearly demonstrates the need for more consumer education on pork quality and how to select pork at the meat counter to achieve the ultimate dining experience.

Introduction

This study was a consumer research project to compare high pH, low pH, and berkshire loins for sensory preference and acceptability. A grant from the Iowa Pork Industry Center (IPIC) provided the resources to make this study possible. The objective of this study was to determine consumer sensory reaction to pork loins of high and low pH as well as berkshire loins. Consumer reaction to the pork loins was accomplished by performing a sensory panel (taste test) analysis of the selected loins with volunteer consumers. The gender distribution of the consumers

participating in this study was 66% female and 34 % male. The median range in age and household income median was 56 to 65 years of age with an income of \$20,001 to \$40,000. Pork consumption for the participants was characterized as 40% consuming fresh pork two or more times per week, 28.6% one times per week, 17.1% three times per month and 14.3% less than three times per month. The consumer sensory panel was conducted in four different sessions over a three-day period.

Materials and Methods

Dr. Ken Prusa, Professor of Food Science and Human Nutrition at Iowa State University specifically selected the high and low pH commodity loins from Swift and Company packing plant in Marshalltown, Iowa. Four loins of each pH level were selected. The high pH loins averaged 6.10 in pH, had an average subjective color score of 4.0 and a marbling score of 3.5. The low pH loins were basically a plant average pH score of 5.65 with a subjective color score average of 2.00 and average marbling score of 1.75. The berkshire loins were from purebred Berkshire hogs obtained from the Iowa State University Teaching Farm. One barrow and one gilt were processed at Mid West Pack, Nevada, Iowa, under state certification inspection. The pH of the four berkshire loins averaged 5.58 with a subjective color score of 3.00 and a marbling score of 3.5. All of the loins, high pH, low pH, and berkshire, were harvested on the same day and were aged 7 days prior to the onset of the study.

Table 1. Color, marbling, and pH of loins

	Color	Marbling	Average pH
High pH	4.00	3.50	6.10
Low pH	2.00	1.75	5.65
Berkshire	3.00	3.50	5.58

The high pH, low pH, and berkshire loins were randomly assigned a three digit identification code for presentation to the panelists. The presentation order of the three loin samples was also randomly assigned. All loin samples were trimmed of external fat and were cut in rectangular pieces that were approximately three fourth of an inch (0.75 in.) thick for cooking. Three George Foreman griddles, each assigned a different loin sample, were used to cook the loin samples to the internal temperature of 160 degrees Fahrenheit (F). All samples were turned every five minutes until reaching the 160 degree (F) cooking temperature. The loins were then cut into approximately one inch by two inch serving samples that were served to the sensory panelists. Each panelist was supplied with a knife and fork to cut their samples into individual bite size servings for evaluation. Between each loin sample evaluation, the panelists were supplied bottled water and crackers. A total of 35 volunteer consumers participated in the sensory panel.

Results and Discussion

Panelists were asked to evaluate the loin samples for overall acceptance, tenderness, juiciness, and flavor. They were instructed to use a 1 to 9 scoring system, with 1 being “Dislike extremely”, 5 – “Neither like nor dislike” and 9 – “Like extremely”.

There was no significant difference between the high pH and berkshire loins for overall acceptance; however, there was a significant difference ($p < .01$) with the low pH sample. The low pH was significantly different ($p < .01$) as compared to the high pH and berkshire loins for tenderness, and the high pH and berkshire loins were significantly different at the ($p < .05$) level for tenderness. When compared to the high pH and berkshire loins, the low pH loin was significantly less preferred ($p < .01$) for juiciness. For flavor, the berkshire and high pH loins were significantly ($p < .01$) preferred over the low pH loin. Also, there was a significant difference ($p < .05$) for the flavor of berkshire loin over the high pH loin. See table two for the values and significant levels for each of the parameters associated with the different loin samples.

Table 2. Loin evaluation scores.

	Loin sample		
	<u>High pH</u>	<u>Low pH</u>	<u>Berkshire</u>
Overall acceptance	7.39 ^a	5.93 ^b	7.13 ^a
Tenderness	8.05 ^{a*}	5.77 ^b	7.37 ^{a*}
Juiciness	6.79 ^a	4.51 ^b	6.39 ^a
Flavor	7.08 ^{ab*}	6.25 ^a	7.31 ^{b*}

Means having different superscript are different, $p < .01$

Means with * differ, $p < .05$

When the sensory panelists were asked their preference between each of the loin samples, the high pH was preferred over the low pH. The high pH was selected over the berkshire and the berkshire was chosen over the low pH loin. See table 3.

Table 3. Loin preference between each loin (% of panelist).

	<u>High pH</u>	<u>Low pH</u>	<u>Berkshire</u>
High pH vs. Low pH	89 %	11 %	xx
High pH vs. Berkshire	77 %	xx	23 %
Low pH vs. Berkshire	xx	23 %	77 %

After the participating consumers completed the sensory analysis, they were shown an uncooked sample of the high pH, low pH, and berkshire loins. The samples were trimmed of all external fat and all three samples were of equal size. The panelist were specifically asked “If you were selecting one of these pork loin samples at the meat counter,

please rank the pork samples in your order of preference for purchase assuming the same price per pound.” The low pH loin sample which was lighter in color and least in marbling was the first choice of approximately 75% of the panelist. Refer to Table 4 for the actual preference of choice results.

Table 4. Uncooked preference of samples (% of panelist).

	<u>1st Choice</u>	<u>2nd Choice</u>	<u>3rd Choice</u>
High pH	00.0 %	34.3 %	65.7 %
Low pH	74.3 %	20.0 %	05.7 %
Berkshire	25.7 %	45.7 %	28.6 %

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